SAN FRANCISCO MARINA
ENGINEERING FEASIBILITY STUDY

June, 1997

Submitted To:
City and County of San Francisco

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M&N File 3915

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1. INTRODUCTION

A. General Description of Surrounding Area

The City and County of San Francisco is located at the center of the San Francisco Bay Area, the largest metropolitan area in Northern California, as shown in Figure 1.

San Francisco Bay is a major recreational boating area for boaters from all over Northern California. The waterfront of San Francisco Bay is dotted with recreational marinas. The marina berth facilities market in San Francisco and the Bay Area as a whole is very stable. Gradually increasing demand for berths in conjunction with the limited availability and high cost of waterfront land has led established marinas to operate at full capacity and newer facilities to experience a gradual, but steady, lease-up to full occupancy. Because of the nearly full utilization of marina berths within the San Francisco, Marin and San Mateo County areas, many facilities maintain waiting lists. Berths at the San Francisco Municipal Marina are in high demand, with over 300 persons on the waiting list for slips at the facility.

The estimated length of the boating recreation season is 300 days.

B. General Description of Proposed Project Site

San Francisco Marina is located on the Northern Waterfront of the City of San Francisco, as shown in Figure 2. The site is approximately one and one-half miles east of the Golden Gate Bridge and west of and adjacent to Fort Mason. The marina is located on property under the jurisdiction of the San Francisco Recreation and Park Commission. The marina adjoins lands of the Golden Gate National Recreation Area (GGNRA), under the jurisdiction of the National Park Service.

The project is located in an area known as the Marina District. The area is bounded on the east by Fort Mason, on the west by Lyon Street and the Presidio, on the south by Marina Boulevard and on the north by the waters of San Francisco Bay.

The San Francisco Marina is composed of two harbors, known as the East Harbor and the West Harbor. The East Harbor, also known as Gashouse Cove, is next to the western boundary of Fort Mason. The East Harbor consists of 343 boat slips, the City Yachts boat sales, and park land which includes a restroom, and two parking lots.

The West Harbor includes the West Harbor marina area, the Saint Francis and Golden Gate Yacht Clubs, the Harbormaster's Building, the park area known as Marina Green which includes restrooms and a concession stand, and four parking lots. There are 343 boats slips in the West Harbor area, of which 269 are in the inner harbor basin, with the balance in the outer harbor basin.

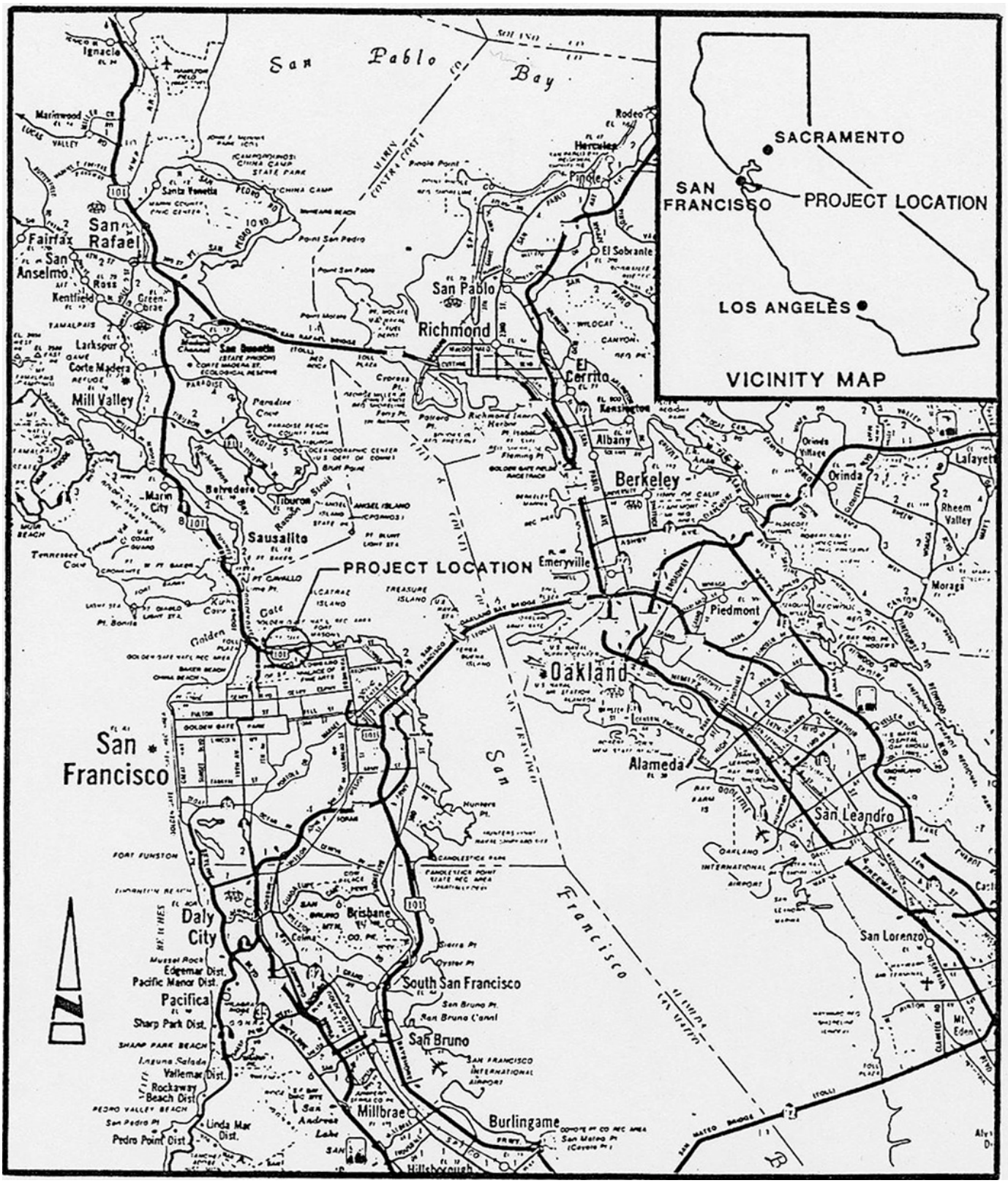


FIGURE 1: VICINITY MAP

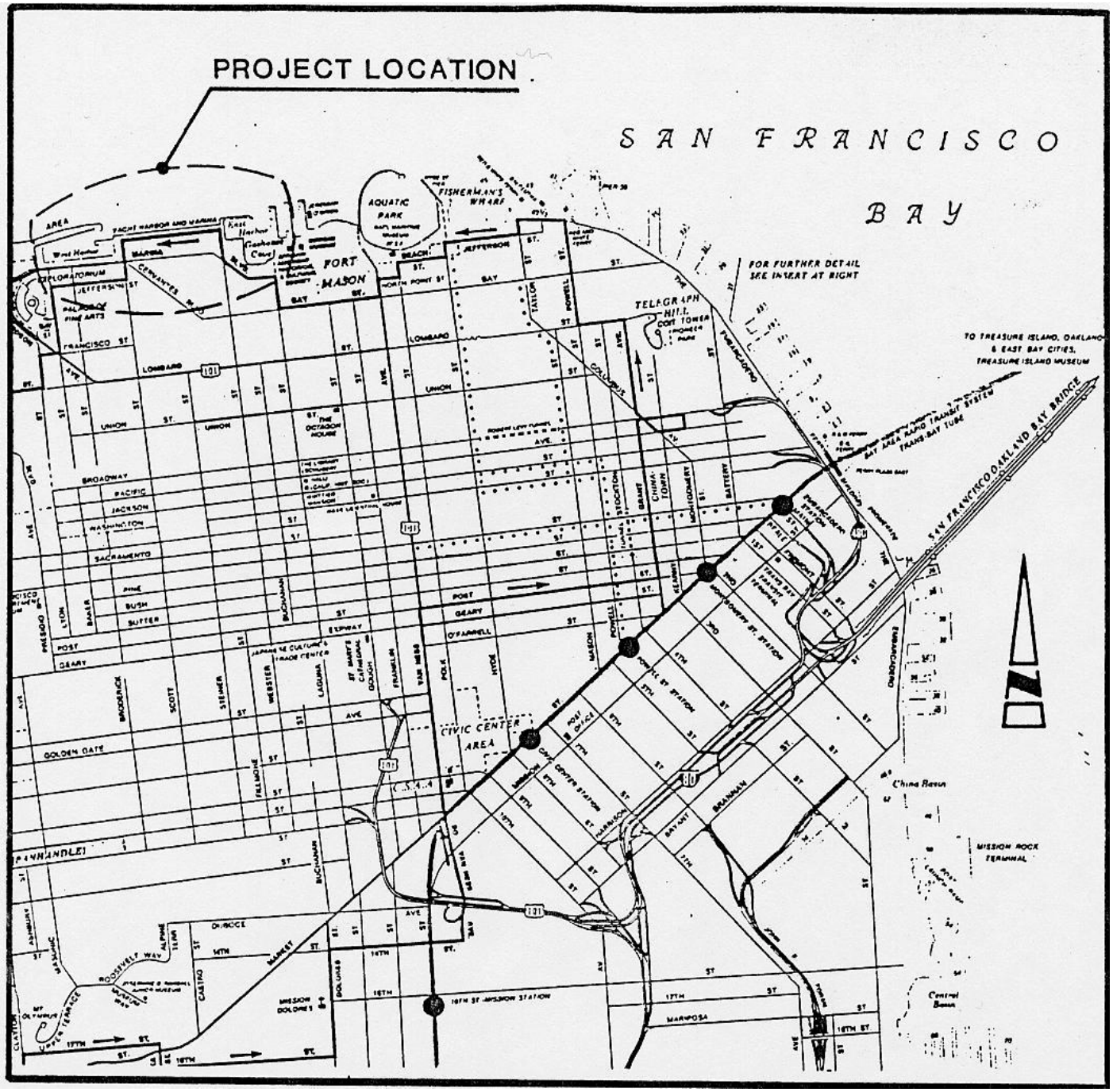


FIGURE 2: LOCATION MAP

The Marina Green, a major city park, is situated between the East Harbor, West Harbor and Marina Boulevard.

Partial protection against wave attack is provided for the West Harbor outer basin by the existing breakwater. The inner harbor basin, however, is well protected. Access to San Francisco Bay is provided by an entrance channel with water depths varying between 10 feet and 20 feet at Mean Lower Low Water (MLLW). Accumulation of sand in the entrance has necessitated more frequent maintenance dredging in recent years. The East Harbor is partially protected against wave action by a sheetpile breakwater. Access to San Francisco Bay is via an entrance channel with water depths of between 10-15 feet at MLLW.

Road access to the site is from Marina Boulevard. Marina Boulevard is a main thoroughfare connecting directly to the Golden Gate Bridge approach. The signal on Marina Boulevard at Buchanan Street regulates traffic movement into and out of the East Harbor parking areas, while the signals at Scott Street and Lyon Street regulate traffic movement into and out of the West Harbor parking areas.

II. EXISTING MARINA FACILITIES

The San Francisco Marina facilities have existed in their present configuration since 1963. The docks and gangways are made of timber and have degraded over time. Other Marina facilities, such as utilities, have become obsolete. The present configuration of the West and East Harbors is shown in Figure 3. The following paragraphs describe the existing condition of the facilities, with a focus on current deficiencies and areas where improvements are needed. The overall condition of the Marina was determined to be poor in a study by Snug Harbor Consultant (1991).

Floating Docks

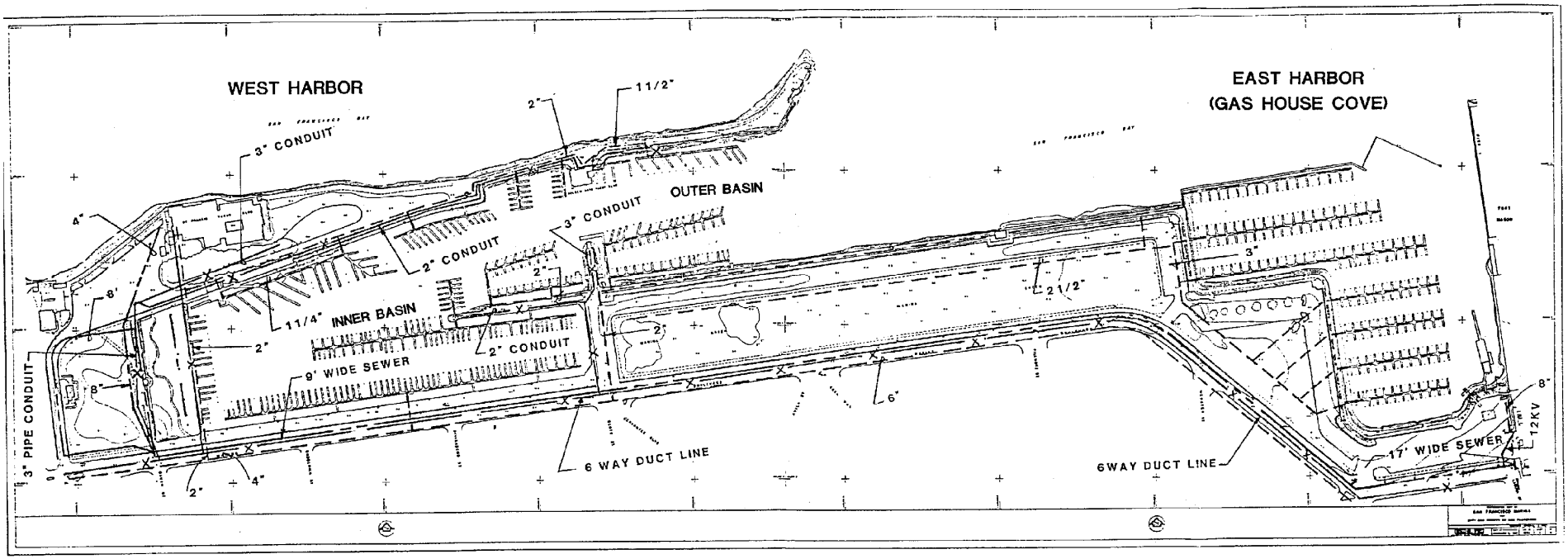
The condition of the existing floating docks varies depending on the dock's age and location within the Harbor. Although some floating docks have been replaced, the majority of the floating docks are over 30 years old. Typical damage to the floating docks consists of the weathering and decay of timber dock components, loss of flotation foam, and structural damage due to age and exposure to surge action. Docks in the outer basin of West Harbor have deteriorated significantly due to wave action, mostly during northeasterly wind storms. The more exposed docks in the East Harbor were also damaged during these wind storms. Significant damage occurs every few years, with the most recent event in February 1997.

Gangways and Security Gates

The existing gangways are made of wood and exhibit signs of aging and some structural fatigue. These gangways are over 30 years old and require a maintenance effort that has increased over time. The security gates are located on the gangways, making it difficult to open and close the gates at low tide when the gangways are at a steep angle.

Access Improvements

Access to the floating docks will be improved in the near future. The improvements will consist of one new gangway and ramp system in each Harbor. The improvements are intended to provide access to the floats that complies with the requirements of the Americans with Disabilities Act (ADA). These improvements will be completed prior to the renovation described in this report. In addition, the landside area of the Marina will be brought into compliance with the ADA.



SEWER LINE

WATER LINE

ELECTRICAL

SOURCE: MARINA IMPROVEMENT PLANS, 1962

FIGURE 3: EXISTING CONDITIONS

Utility Systems

The general condition of the various utility systems is poor. The maintenance effort required is steadily increasing, as a result of the wear and tear over many years of service, and the difficulty of finding suitable replacement parts for the outdated systems. A major utility and safety problem on the floating docks is the lack of a fire protection system.

- **Water**

  The location of freshwater hose bibbs at berths varies from dock to dock. On most of the older docks, hose bibbs are located below the deck and are covered by an access hatch. The present hose bibb accessibility makes it difficult to provide the continuous freshwater shore-tie that many boaters desire.

- **Electrical**

  The electrical power capacity to each berth is substandard for the requirements of today's boats. The electrical receptacles are equipped with a screw-in plug, which is not standard in modem marinas.

- **Telephone**

  Telephone service to berths has been provided in a piece-meal fashion, and was not part of the original floating dock installation. Telephone cables are attached to the side of the docks and gangways and are underwater at many locations.

Parking

Existing parking spaces are limited, and the popularity of the Marina overloads parking capacity during peak usage.

Permit spaces for Boater-Only use on weekends are often not available due to inappropriate use of these spaces by vehicles without permits. Parking for East Harbor tenants is affected by traffic flows to and from Fort Mason, overflow parking from Fort Mason activities, Safeway employee parking and Marin County commuter parking.

Shoreline Revetments

Shoreline slopes have degraded in the East Harbor and in portions of the West Harbor.

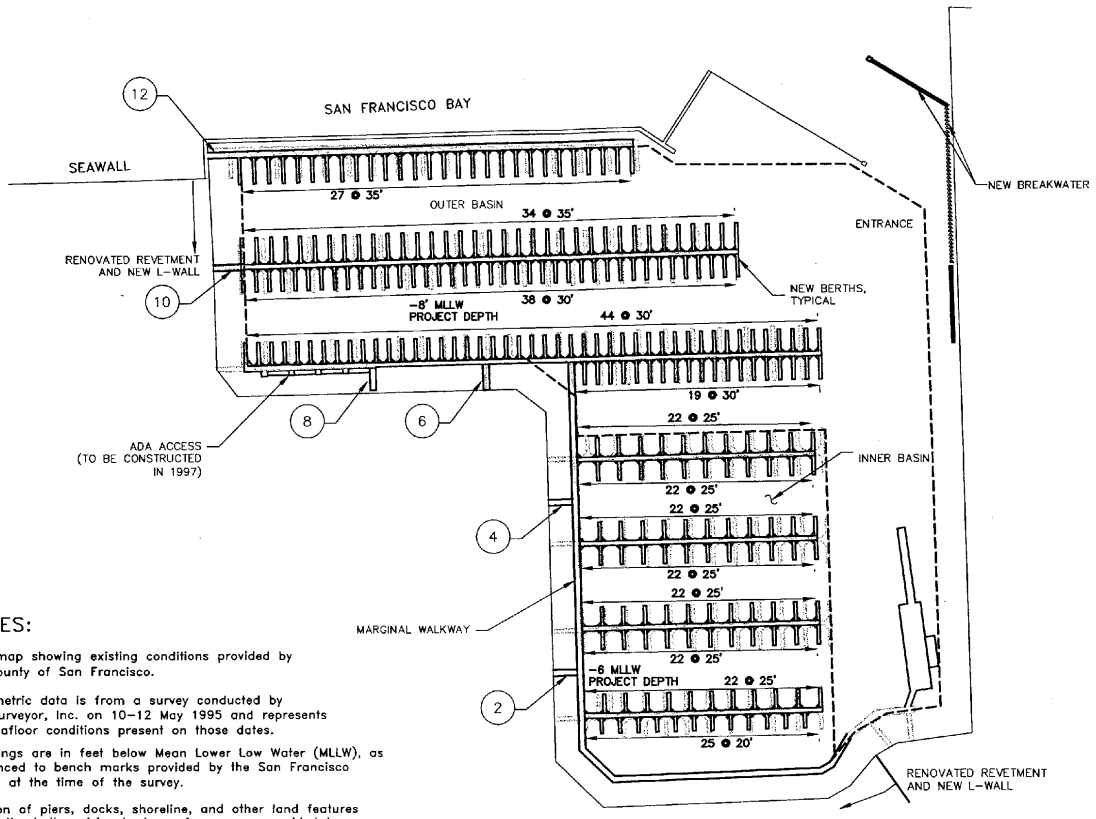
In the East Harbor, slopes along the landside perimeter of the basin are failing. The rock slope protection has sloughed down the banks. As a result, surge activity and waves during high tide erode the exposed upper portions of the shoreline slopes.

In the outer basin of the West Harbor, and immediately west of the Golden Gate Yacht Club, the harbor side of the breakwater peninsula's shoreline has been damaged. The existing revetment is made of rubble and has degraded from exposure to wave and surge action. Near the Harbormaster's office, the lower portion of the basin perimeter consists of rubble which has also sloughed.

III. PROPOSED IMPROVEMENTS

The proposed improvements provided in the project are listed below. A description of the individual project elements is presented in Section IVB. The proposed improvements are identified in Figure 4A and 4B for the West and East Harbors respectively.

- Breakwater improvements to reduce wave action in the East Harbor;
- Dock replacement for the berths in the East Harbor and the inner basin of the West Harbor, with the exception of the docks operated by the St. Francis Yacht Club;
- Utility service upgrade for the new docks, including a fire suppression system;
- Gangway and security gate replacement;
- Dredging;
- Renovation of failing shoreline revetments;
- Construction of Parking Access Control Gates;
- Landscape improvements to the landside areas around both Harbors.



NOTES:

Base map showing existing conditions provided by City/County of San Francisco.

Bathymetric data is from a survey conducted by Sea Surveyor, Inc. on 10-12 May 1995 and represents the seafloor conditions present on those dates.

Soundings are in feet below Mean Lower Low Water (MLLW), as referenced to bench marks provided by the San Francisco Marina at the time of the survey.

Location of piers, docks, shoreline, and other land features shown the bathymetric chart are from maps provided by the San Francisco Marina. Their locations are approximate and were not confirmed by Sea Surveyor, Inc.

(XX) = GANGWAY NUMBER

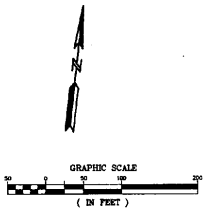


FIGURE 4B

MOFFATT & NICHOL ENGINEERS SAN FRANCISCO, CALIFORNIA	PROPOSED IMPROVEMENTS EAST HARBOR (GAS HOUSE COVE) SAN FRANCISCO MARINA

IV. ENGINEERING FEASIBILITY

An engineering analysis of the site conditions in the Marina and the proposed improvements in the project was performed to determine the engineering feasibility of the project. The analysis was divided into three parts: Site Conditions, Project Elements, and Construction Cost Estimate.

A. Site Conditions

A. I Climatology

The site climate is characterized by mild and moderately wet winters and by dry, cool summers. Winter rains from November through March account for over 80% of the average annual rainfall. Severe winter storms with gale winds and heavy rains occur occasionally. The summer weather is dominated by a cool sea breeze which is light in the morning and increases in magnitude in the afternoon. A sea fog, arriving during the late afternoon or evening, is another persistent feature of the summer weather. Although this fog has a tendency to burn off by early afternoon, it contributes significantly to the typically overcast conditions experienced during San Francisco summers. Mean monthly temperatures vary between approximately 49°F in January and 64°F in September.

Wind

Mean and maximum directional wind speeds are presented in Table IV-1. Mean speeds are based upon Alameda Naval Air Station (NAS) wind data for the period 1945-1972 (State of California, 1978), and maximum (fastest mile) wind speeds are based upon an analysis of wind data at the Alameda NAS and at San Francisco by Ecker and Whelan (1983). Due to local topographic influences, surface wind speeds and direction at the site may vary from those shown in Table IV-1.

TABLE IV-I

DIRECTION	% OCCURANCE OF MEAN SPEED	MEAN SPEED (mph)	MAXIMUM SPEED (mph)
N	4.7	7.4	43
NNE	I.I	6.5	33
NE	I.I	5.9	30
ENE	0.6	5.7	30
E	2.2	5.4	26
ESE	3.1	7.6	33
SE	5.0	10.0	47
SSE	2.9	9.9	43
S	4.4	8.5	47
SSW	3.2	8.6	36
SW	7.6	9.1	47
WSW	9.3	10.3	33
W	22.1	11.5	43
WNW	9.7	10.2	43
NW	7.0	8.0	39
NNW	S 0	78	39

A.2 Existing Environmental Conditions

Water Depths

The most recent bathymetric survey that includes all of both basins was completed by Sea Surveyor in May 1995. The depths in the inner basin of the West Harbor berthing area vary from 6 feet to 9 feet below MLLW and in the entrance channel from 9 feet to 14 feet below MLLW. Depths in the outer basin of the West Harbor berthing areas vary from 4 feet to 11 feet below MLLW and in the entrance channel from 7.5 feet to 25 feet below MLLW.

Depths in the East Harbor berthing areas vary from 5 feet to 8 feet below MLLW. The depth in the entrance channel is approximately 10 to 15 feet below MLLW.

Tides

The tides of San Francisco Bay are of a semi-diurnal mixed typed with two high and two low waters each day with a diurnal inequality (i.e. a difference in height between successive high waters or low waters). Changes in winds and barometric conditions can cause variations in the tide level from day to day, and are not factored into the daily tide predictions for the area. These variations are, however, factored into the determination of the tidal planes,

which are presented in Table IV-2 for the Presidio tide gage station, the closest station to the project site (NOS, 1984).

TABLE IV-2

TIDAL PLANE	FEET ABOVE MLLW
Highest Observed Water Level	8.9
Mean Higher High Water	5.8
Mean High Water	5.2
Mean Tide Level	3.2
Mean Sea Level (NGVD)	2.8
Mean Low Water	1.1
Mean Lower Low Water	0.0
Lowest Observed Water Level	-2.7

The city datum is a commonly used reference for landside construction in San Francisco. This datum is 11.67 feet above MLLW at the Presidio Tide Station.

Currents

The variation in tidal currents is similar to that of the tide, though the relation of current to tide is not constant. Currents exhibit a semi-diurnal inequality and are frequently affected by wind or variations in river discharge. Tidal current charts for San Francisco Bay (NOAA, 1973) show maximum current speeds in the open water areas north of the harbor to be 1-2 knots on a flood current and 2-4 knots on an ebb current.

Current data within the harbor areas is not available. However, it may be concluded that tidal currents within the harbor basins are minimal relative to the open water area. Wiegel (1967) noted that currents displayed a secondary effect in the East Harbor, causing waves from a westerly direction to refract into the harbor.

Tsunamis

Calculations of runup due to seismic sea waves (tsunamis) of distant origin have been made for San Francisco Bay by the U.S. Army Waterways Experiment Station (1975). The values presented in Table IV-3 are water levels that would be exceeded on the average of once per 100 and once per 500 years. The statistical effect of the astronomical tides on tsunami runup was recognized in the analysis.

TABLE IV-3

Return Period (Years)	Runup Level (Ft Above MLLW)
100	10
500	16.6

Moffatt & Nichol (1976) reported that water level fluctuations within San Francisco Bay during the tsunami resulting from the Alaskan earthquake of March 1964, ranged between two and three feet. The tsunami of May 1960 was also greatly attenuated after passing through the Golden Gate.

Waves

Excessive wave action is a problem within both harbors, causing damage to vessels and floats in the outer harbor areas under storm conditions. An attempt to remedy the problem in the East Harbor was undertaken in the 1970's by constructing a breakwater addition linking the seawall and the previously detached breakwater. Wave action continues to be a problem, however. For example, significant damage to floats and berthed boats occurred during strong northeasterly winds on December 14 -15, 1988 (Moffatt & Nichol Engineers, 1988). Damage was concentrated in the outer basin of the West Harbor, and the docks adjacent to the entrance channel in the East Harbor. Repair costs were approximately $150,000 (1988 dollars). Damage to floats in the outer basin of the West Harbor and the East Harbor occurred again in February 1997 (personal communication with Gary Davis, Harbormaster).

This section examines the wave conditions at the harbor entrances and the effect of the protective structures on the wave energy levels incident to both harbors.

(i) Incident Wave Conditions

Waves incident at the Marina can be from locally generated wind waves, longer period waves generated in the Pacific Ocean, or ship-generated waves.

Long period waves generated in the Pacific Ocean provide the most severe incident wave conditions from the northwesterly direction; locally generated wind waves provide the most severe incident wave conditions from the northeasterly direction.

Long period waves originating in the Pacific Ocean are transformed by refraction, diffraction and shoaling as they propagate across the San Francisco offshore bar and are transmitted into San Francisco Bay. An analysis of such long period waves at Fort Point Station was done by Ecker and Whelan (1983). This analysis revealed highest significant wave heights of 5.2 feet with corresponding wave periods of 13 seconds. A similar analysis by Moffatt and Nichol, Engineers (1976) for Fisherman's Wharf Harbor revealed significant wave heights of less than 3 feet. Based upon these results it may be concluded that the maximum long period incident wave conditions at the project site are approximately a 5 foot significant wave height with a corresponding 13 second wave period. Wiegel (1967) observed waves of 8 to 10 second period and 2 to 3 foot (average) height breaking at the seawall just west of East Harbor during two major storms.

An analysis of locally generated wind waves, based upon Alameda NAS wind data (State of California, 1978), revealed that significant wave heights of up to approximately 4 feet with wave periods of up to 4 seconds are likely to occur at the harbor entrances. These results are in agreement with previous locally generated wind wave analyses presented by the U.S. Army Corps of Engineers (1973) for Gas House Cove Harbor, U.S. Army Corps of Engineers (1985) for Fisherman's Wharf Harbor, and Ecker & Whelan (1983) for Fort Point Station. Moffatt & Nichol, Engineers personnel estimated from visual observations wave heights of about 4 feet with periods of about 4 seconds from the northeast during the December 1988 storm.

Ship-generated waves resulting from traffic outside the harbor have short periods and can be considered to be similar, but less critical, than locally generated waves. High-speed passenger ferries, which are becoming more prevalent, can produce waves with longer periods and heights of two to three feet, similar to the swell incident to the site. Wiegel (1967) noted that ship-generated waves entered the East Harbor and that the worst approach direction was the northeast.

The U.S. Army Corps of Engineers installed a wave recording system on the end of the breakwater at the entrance to East Harbor. This gage was in operation from August, 1968 to March, 1969. The Corps of Engineers (1971) reported that while waves of large magnitude occur relatively infrequently, waves from *Vi* to I foot in height were continuously present at the harbor entrance.

(ii) East and West Harbor Wave Conditions

Waves are transformed on entering the harbors due to the effects of diffraction, refraction, shoaling and reflection. Wave diffraction, which involves lateral transfer of wave energy along a wave crest, is the dominant wave transformation mode for this situation.

Wave action within the East Harbor and the outer basin of the West Harbor has caused excessive vessel motions and damage. Wave action in the inner basin of the West Harbor has generally not been a problem.

Sedimentation

Sedimentation within the harbors has not been a major problem in the past. Dredging operations occurred on an infrequent basis. Phillip Williams and Associates (1986) reported that the total dredging required in the West Harbor from 1973 - 1986 was about 3,500 cubic yards, yielding an average of 250 cubic yards per year. However, the rate of sediment accumulation in the East Harbor and the outer basin of the West Harbor is reported to have recently increased.

The source for this deposited material is literally transported sand from Crissy Field Beach and fine suspended sediments present in the water column. The sand drifts eastward along Crissy Field Beach due to prevailing wave conditions. This sand forms the beach on the Bay side of the protective peninsula at the West Harbor and appears to be the source of the tip shoal which has formed inside the West Harbor Entrance. Fine suspended sediments in the water column, which are carried by tidal action to both the East and West Harbors, tend to settle out and accumulate in the lower energy environments provided by the harbor basins.

A five year dredging plan developed in 1994 included an estimated requirement for 220,000 cubic yards of maintenance dredging from 1994 to 1998 (Advanced Biological Testing, Inc., 1994). The volume estimate included 105,000 cubic yards for the East Harbor and 115,000 for the West Harbor. The quantities were estimated for permitting purposes and included a substantial over-dredge volume. Actual maintenance dredging should be less. Dredging of the entrance channel and turning basin in the West Harbor was completed in 1996. Additional dredging is planned for 1997.

Water Quality

The City and County of San Francisco Clean Water Program has monitored coliform bacteria levels at several stations within the Marina. Available data reviewed spans the period January 1987 to August 1988.

Three outfalls discharge wastewater overflows in the area during peak runoff events. The system is designed to average eight overflows per year. Two of the outfalls discharge into the Marina. The Pierce Street outfall, which discharges into the outer basin of West Harbor, and the Laguna Street outfall, which discharges into the East Harbor. The Baker Street outfall discharges directly into the Bay, west of the West Harbor.

The monitoring program data revealed occasional violation of California Regional Water Quality Control Board bacterial standards for water-contact recreation. Almost all the violations occurred at the beach area in the West Harbor. Most of the violations were related to rainfall runoff, and there was no consistent pattern of excessive bacterial counts.

A.3 Geotechnical

Subsurface soil conditions for the Marina are contained in Geotechnical Reports previously prepared for the City. These include Dames & Moore (December, 1961) and Geotechnical Consultants, Inc. (Parsons Brinkerhoff, October, 1983). The types of soils encountered at the site, in descending order from the surface, include artificial fill. Younger Bay Mud, Bay Side Sands, Older Bay Mud and Franciscan Bedrock.

A Geotechnical Engineering Study was prepared by Harding Lawson Associates to evaluate the seawall and slope stability around the West Harbor perimeter. The study concluded that channel dredging is possible using side slopes of 3:1 protected, or 5:1 unprotected.

B. Project Elements

A Master Plan for the San Francisco Marina was undertaken by the San Francisco Recreation and Park Department to identify the parts of the Marina for which repairs or upgrades were necessary (SFDPW, 1989). Those existing facilities in urgent need of repair or upgrade were identified as Priority Project Elements. Several of these elements are not presently proposed due to public concerns regarding visual quality, marina expansion, and traffic impacts. The berth count resulting from the proposed improvements will remain approximately the same. The following paragraphs describe the proposed Project Elements.

Construction of East Harbor Breakwater Improvements

The existing East Harbor breakwater provides sheltering for waves from the northwest direction, although long period wave action causes surging on occasion. The breakwater provides little protection for waves from the north or northeast directions, and this condition is exacerbated because these waves can enter by passing beneath the Fort Mason Pier. Additional breakwater segments as shown in Figure 4B will reduce wave action in the East Harbor. An innovative breakwater system has been proposed, which will require further testing to validate its performance. A portion of the breakwater consists of a slotted wall to protect the berths from waves incident from the north and northeast while limiting the reflection of waves from the northwest direction. The approximate wave energy reduction in the most exposed area of the East Harbor is estimated to be about 90% for the critical northeast direction. There will be an increase in wave energy due to partial reflection of waves incident from the northwest direction. The benefit of the sheltering should more than compensate for the increase in reflected wave energy.

Replacement of the Floating Docks in the East Harbor and Inner Basin of the West Harbor

New floating docks will replace the existing docks in the East Harbor and inner basin of West Harbor. The current number of berths and their configuration will be approximately maintained. Marginal walkways will be added to extend new barrier-free access to a greater number of berths. Reconfiguration of some the new berths in the West Harbor to align with the prevailing westerly winds is provided.

Upgrade of Utilities at all Berths

New electrical, water, and telephone utilities will be provided on the new floating docks.

Electrical improvements will use standard receptacles and provide a minimum capacity of30 amps per berth. The water system capacity will be increased and fire protection stations will be provided on the new floating docks. The telephone system will be replaced and standardized.

Replacement of all Gangways and Security Gates

All gangways will be replaced with standard low-maintenance aluminum units. Security gates will be replaced and relocated to access platforms at the top of the gangways. The security locks will be replaced with an improved security

system. A reduction in the number of gangways is proposed due to the addition of the marginal walkways.

Special access ramp systems are scheduled for construction in 1997 and are therefore treated as existing facilities in this study. These access ramps comply with the requirements of the Americans with Disabilities Act (ADA). One access ramp will be constructed in each Harbor. To extend the access on the floating docks, new marginal walkways are provided.

Dredging to Provide Adequate Basin Depths in the East and West Harbors

Dredging will be performed to restore original design depths in both harbors. Dredging will provide navigable depth in the main access channel, turning basin and Yacht Club guest docks in the West Harbor.

The actual quantity of project related dredging will be determined by scheduling requirements and the amount of dredging accomplished in the next few years. Dredging costs will depend on disposal requirements that will be better understood after sediment sampling and testing is completed. An allowance for dredging is included in this project.

Renovation of Degraded ShoreUne Revetments in the East and West Harbors

Existing rip-rap slopes around the interior shorelines of the Marina are currently degraded as a result of erosion and rock slope sloughing, primarily in the East Harbor, and in the West Harbor near gangway I and at the toe of the walls in the vicinity of the Harbormaster's office. Reconstruction will key the slopes at the toe and provide filter fabric below the rip-rap to improve the stability of the revetment. A reinforced concrete wall is proposed at the top of the existing slope in the East Harbor due to space limitations.

Construction of Parking Access Control Gates

Conversion of two existing parking areas to peak-use controlled parking will be considered, with one at East Harbor, and one along Marina Boulevard at the inner basin of West Harbor. Traffic control gates will be installed and operated during peak-use hours to allow boater-only access to these parking areas.

Construction ofLandscaping and Public Access Improvements

Landscaping and universal public access improvements will be provided in landside areas around both Harbors. Landscaping will be required along the perimeter of the East Harbor where reconstruction of the perimeter revetments is proposed.

Construction Staging

The project includes replacement of floats in stages to limit displacement of existing tenants during construction. The staging will involve replacement of portions of the floats, and associated dredging and perimeter treatments, in a step-wise progression. In this way, a manageable number of tenants will be temporarily relocated for each stage. Careful planning is required, and a construction cost premium is expected.

C. Construction Cost Estimate

The estimated construction cost for the Marina improvements are contained in Table IV-4.

Table IV - 4

Moffatt & Nichol Engineers
San Francisco Marina
East and West Harbor Replacement
OPINION OF PROBABLE CONSTRUCTION COSTS

06/11/97
EST. BY: RTB & CGT

#	DESCRIPTION	QTY.	UNIT	UNIT COST	TOTAL
	WEST HARBOR				
1	**Mobilization and Demobilization**	1	LS	5%	$222,235
2	**West Harbor Dock Replacement**	279	Berth	$10,800	$3,013,200
3	**Dock Utility Upgrade and Replacement**	279	Berth	$2,500	$697,500
4	**New Gangways**	10	EA	$17,000	$170,000
5	**New Security Gates**	9	EA	$3,000	$27,000
6	**Dredging - West Harbor (Allowance)**	1	LS	$60,000	$60,000
7	**Upgrade West Harbor Revetments**	1600	LF	$200	$320,000
8	**Parking Access Control Gates**	2	EA	$16,000	$32,000
9	**Landscaping Allowance**	1	LS	$125,000	$125,000
			WEST HARBOR SUBTOTAL		$ 4,666,935
	CONSTRUCTION STAGING		5%		$ 233,347
	CONSTRUCTION CONTINGENCY		10%		$ 466,694
	ESTIMATED ENGINEERING & ADMINISTRATION COSTS		10%		$ 536,698
	TOTAL WEST HARBOR				$ 5,903,673
	TOTAL PER BERTH				$21,160
	EAST HARBOR				
1	**Mobilization and Demobilization**	1	LS	5%	$325,120
2	**East Harbor Slotted Breakwater**	205	LF	$5,000	$1,025,000
3	**East Harbor Sheetpile Breakwater**	230	LF	$3,400	$782,000
4	**East Harbor Dock Replacement**	341	Berth	$6,900	$2,352,900
5	**Dock Utility Upgrade and Replacement**	341	Berth	$2,500	$852,500
6	**New Gangways**	5	EA	$17,000	$85,000
7	**New Security Gates**	6	EA	$3,000	$18,000
8	**Dredging - East Harbor (Allowance)**	1	LS	$270,000	$270,000
9	**Upgrade East Harbor Revetments**	1600	LF	$600	$960,000
10	**Parking Access Control Gates**	2	EA	$16,000	$32,000
11	**Landscaping Allowance**	1	LS	$125,000	$125,000
			EAST HARBOR SUBTOTAL		$ 6,827,520
	CONSTRUCTION STAGING		5%		$ 341,376
	CONSTRUCTION CONTINGENCY		10%		$ 682,752
	ESTIMATED ENGINEERING & ADMINISTRATION COSTS		10%		$ 785,165
	TOTAL EAST HARBOR				$ 8,636,813
	TOTAL PER BERTH				$ 25,328
	TOTAL ESTIMATE				$ 14,540,486
	TOTAL PER BERTH				$ 23,452

Environmental/permitting/hazardous material costs are not included.

V. MARKET REVIEW

The market review conducted for this feasibility study is a general review rather than a complete market analysis. The reason for this approach is that the existing boat berths in the Marina will essentially be replaced in the West Basin and the East Basin. Table V-1 shows the existing and proposed berths in each of the Marina's sub-basins.

TABLE V-1
SAN FRANCISCO MARINA
EXISTING AND PROPOSED BOAT BERTHS BY SIZE

Berth Length in Feet	EXISTING				PROPOSED			
	West Basin	Outer West	East Basin	Totals	West Basin	Outer West 1)	East Basin	Totals
20	21	1	19	41	28	1	25	54
25	36	35	153	224	36	35	154	225
30	41	32	103	176	32	32	101	165
35	23	0	68	91	24	0	61	85
40	72	1	0	73	78	1	0	79
45	20	5	0	25	33	5	0	38
50	17	0	0	17	15	0	0	15
60	25	0	0	25	20	0	0	20
80	0	0	0	0	9	0	0	9
90	10	0	0	10	0	0	0	0
110	4	0	0	4	4	0	0	4
Totals	269	74	343	686	279	74	341	694

1) No redevelopment is planned in Outer West at this time.

Sources: City and County of San Francisco, Moffatt & Nichol Engineers

It may be noted that the renovation program will add only 8 berths to the Marina, and is essentially aimed at keeping the same berth length distribution.

Based upon this replacement concept, for the proposed capital improvement program the market review is focused on the question of the strength of the existing market for boat berths in San Francisco and how this existing market strength would be impacted by the renovation program at the Marina. For example, the improvement program may require increases in berth rates in order to achieve financial feasibility. In that event, a question which arises is would this rate increase lower berth occupancy at the Marina. The emphasis of the market assessment is on boat berths since on average approximately 92 percent of the Marina's operating income is generated by permanent berth and mooring charges.

The approach used for this market review included; a survey of competitive marinas to determine current boat berth occupancies, rates, waiting lists and other pertinent market conditions, and a review of the current Marina waiting list.

Table V-2 presents an inventory of the three major San Francisco marinas. The only vacancies reported were at Pier 39, with approximately 28 vacant berths. The overall occupancy of 98 percent in these marinas show an excellent market capture for San Francisco marinas.

TABLE V-2
SURVEY OF SAN FRANCISCO MARINAS
SPRING 1997

Marina	Berth Inventory	Percent Occupancy	Average Monthly Rental Rate Per Linear Foot	Number on Wait List
San Francisco Municipal Marina	686	100%	$5.24	321
Pier 39	310	91%	$7.63	0
South Beach Marina	683	100%	$7.06	300
Totals	1,679	98%		621

Source: City and County of San Francisco, Williams-Kuebelbeck & Associates Telephone Survey

In addition to high occupancies. Pier 39 and South Beach Marina, with average berths rates of $7.63 and $7.06 per linear foot per month respectively, have rental rates well in excess of most recently reported average rates for public marinas ($5.06) and private marinas ($5.52) throughout the San Francisco Bay Area. Historically, San Francisco Municipal Marina has charged relatively low berth rates.

The survey found that in the East Bay and on the San Francisco Peninsula occupancy rates were significantly lower than in San Francisco. The phenomenon is a function of the early 1990's recession and significant additions to the marina inventory in the late 1980's.

The survey indicated that San Francisco Marina had not raised their berth rental rates over the last few years. In 1994 San Francisco Marina enacted a 30 percent increase in rates. In 1993 Pier 39 increased their rates by about 6 percent. South Beach Marina has not raised its rates since opening in the late 1980's. South Beach Marina reports no plans to raise rates until at least after 2000 and Pier 39 would not divulge their plans.

TABLE V-3
SAN FRANCISCO MARINA BERTH WAITING LIST
VS. PROPOSED IMPROVEMENT PROGRAM

Berth Length in feet	Number Currently on Waiting List	Number in Proposed Improvement Program	Wait List as Percentage of Inventory Under Proposed Improvement Program
20	3	54	6%
25	29	225	13%
30	71	165	43%
35	69	85	81%
40	92	79	116%
45	21	38	55%
50	13	15	87%
60	19	20	95%
80	3	9	33%
90	0	0	0
100	1	0	(+)
110	0	4	(-)
	321	694	46%

Source: City and County of San Francisco, William-Kuebelbeck & Associates, Inc.

Table V-3 presents the current San Francisco Marina berth waiting list and compares this list to the proposed improvement program. Boat owners must pay $50 which keeps them on the wait list for five years. Some of the 321 boat owners on the current waiting list have been waiting for over ten years for a berth at the manna. The majority of people on the waiting list have boats which prefer berthing in berths from 30 to 50 feet in length (83 percent of those on the waiting list). The table shows the wait list totals compared with the number of berths which will be available upon completion of the proposed improvement program. This comparison shows particular demand, as exhibited by the wait list, for 35. 40. 45, 50 and 60 foot berths.

In conclusion, the current and foreseeable demand for boat berths in San Francisco marinas, and the San Francisco Marina in particular, is strong. No new plans for competitive marinas are being seriously considered at this time. Although berth rental rate increases are always market sensitive, particularly in public marinas, there is ample justification for increases in berth rates at the Marina after the proposed improvements are provided. In fact. South Beach Marina's average monthly berth rates per linear foot are currently approximately 35 percent higher than rates at the Marina ($7.06 compared with $5.24 or $1.82 higher).

VI. FINANCIAL ANALYSIS

This section evaluates the financial feasibility of the proposed San Francisco Municipal Marina renovation program, based upon available capital funding for the project.

RENOVATION COSTS AND FUNDING SOURCES

RENOVATION COSTS

A detailed breakdown of renovation costs was presented in Section IV. Total project costs, including design and contingency costs, are estimated at approximately $14.5 million in current dollars. Table VI-1 presents these cost estimates arrayed by renovation phase and escalated to reflect budget requirements when required to be used for the project.

TABLE VI-1
BUDGETED PROJECT COSTS
SAN FRANCISCO MARINA-RENOVATION PROGRAM

Redevelopment Phase/Description	Cost Estimates 1997 1)	Budget Estimates 2)	Estimated Year to be Spent
	(In Millions)		
I - Design (design for entire project)	$1.3	$1.4	FY 98-99
II - West Basin Renovation	5.4	6.0	FY 00-01
III - East Basin Renovation	7.8	9.1	FY 01-02
Totals	$14.5	$16.5	

1) See Table IV-4.
2) Escalated at 3 percent per year to estimated expenditure year.

Source: Moffatt & Nichol Engineers, Williams-Kuebelbeck and Associates

The table notes that the renovation program is divided into three phases. Phase I is for design of the entire renovation program. It is assumed that this amount will be available and spent during FY 1998-99. Phase II will be the renovation of the West Basin. It is assumed that this construction will occur over a 15 month period starting in Spring ofFY 1999-00. Phase III will be the renovation of the East Basin. It is assumed that this construction will occur over a 12 month period during FY 2001-02. In essence, the entire proposed renovation program is to be completed and all improvements available to marina users in FY 2002-03 or by July 1,2002, approximately five years from now.

FUNDING SOURCES

The primary sources of funding recommended for this project is a combination of loans from the California Department of Boating and Waterways, under their Small Craft Harbor Program, and Marina reserve funds.

It is recommended that Phase I and Phase II be funded entirely through $7.4 million in State loans; $1.4 million to be received in FY 1998-99 and $6.0 million to be received in FY 1999-00. The Phase III $9.1 million capital cost is to be shared between the State and the City and County, $7.1 million and $2.0 million respectively. State loans are available at 4.5 percent annual interest amortized for 30 years. Table Vl-2 presents the loan and repayment schedules for the $14.5 million in State loans required for the project.

TABLE VI-2
STATE LOANS AND REPAYMENT SCHEDULES
SAN FRANCISCO MARINA - RENOVATION PROGRAM

Renovation Phase/Loan Amount		Fiscal Year for Loan Receipt	Debt Service (in Thousands) - Per Fiscal Year 1) 99-00	00-01	01-02	02-03	03-04 & Thereafter
In Millions							
I	$1.4	98-99	$43 2)	$86	$86	$86	$86
II	6.0	99-00	--	--	276 3)	368	368
III	7.1 4)	01-02	--	--	--	218 2)	436
Totals	$14.5		$43	$86	$362	$672	$890

1) Based upon a 30 year loan at 4.5 percent interest.
2) One-half drawn down in prior year.
3) Seventy-five percent drawn down in prior year.
4) City and County contributes $2 million from Marina reserve funds.

Source: Williams-Kuebelbeck and Associates

FINANCIAL FEASIBILITY

HISTORIC AND CURRENT INCOME AND EXPENSES

Table Vl-3 presents historic and projected cash flows for the five year period FY 1993-94 through FY 1997-98. This period is presented as the pre-renovation period. It may be noted from the table that the Marina has enjoyed satisfactory net operating incomes over the projection period. It is quite evident that the Marina's primary source of Operating Income is from Berthing Fees. Berthing Fees constituted 92 percent of Operating Income in the last full

operating year, (FY 1995-96) and is projected to maintain that same proportion of Operating Income this year (FY 1996-97).

Operating Expenses appear to be well controlled with the majority of variation occurring in the category of Contractual and Other Services. In addition to Operating Expenses, the Marina incurs significant Capital Expenses, a large portion of which goes to maintenance dredging. A focus of the renovation program will be aimed at reducing both Operating and Capital Expenses.

TABLE VI-3
SAN FRANCISCO MARINA
PRE-RENOVATION CASH FLOW HISTORY AND PROJECTIONS
FY 1993-94 THRU FY 1997-98

	Fiscal Years - Figures in Thousands				
	93-94	94-95	95-96	96-97 [1]	97-98
		Actual		Projected	
OPERATING INCOME					
Berthing Fees					
Permanent Berths					
West Basin	$541	$654	$657	$686	$690
Outer West	94	113	114	121	122
East Basin	405	490	493	539	541
Sub-total	1,040	1,257	1,264	1,346	1,353 [3]
Other Berth Related	70	78	76	66	72 [3]
Sub-total Berthing Fees	1,110	1,335	1,340	1,412	1,425
Land Rents, Concessions & Miscellaneous	106	111	122	129	133 [4]
Sub-total Operating Income	1,216	1,446	1,462	1,541	1,558
OPERATING EXPENSES					
Payroll	577	576	589	591	609 [4]
Contractual & Other Services	116	108	251	200	200 [3]
Materials, Supplies & Equipment	48	50	21	37	37 [3]
Overhead	47	50	50	52	54 [4]
Sub-total Operating Expenses	788	784	911	880	900
NET OPERATING INCOME	428	662	551	661	658
Less: DEBT SERVICE	23	23	23	23	23
Less: CAPITAL EXPENSES	317	425	499	438	400
Plus: INTEREST INCOME	69	80	107	86	98 [6]
ANNUAL SURPLUS	$157	$294	$136	$286	$333
Plus: PREVIOUS SURPLUS	.....	.....	.....	$1,671 [5]	$1,957
CUMULATIVE SURPLUS				$1,957	$2,290

1) Projected based upon actual numbers reported for 7/1/96 through 3/31/97.
2) Based upon 93 percent of $1,423,700 capacity under 100 percent occupancy and current berth rental rates.
3) Average for prior 4 years used since annual totals vary.
4) FY 1996-97 totals escalated at 3 percent per year.
5) Cash balance in Marina Yacht Harbor Special Fund, July 1, 1996.
6) Based upon a 5 percent per annum yield on cumulative surplus for prior year.

Source: City and County of San Francisco, Williams-Kuebelbeck & Associates, Inc.

It is also noteworthy that the Marina should have a reserve fund balance of almost $2 million at the close of FY 1996-97. Since the Marina is an Enterprise Fund this surplus is invested and earns interest income annually. Finally, Table Vl-3 shows that the Marina has run surpluses each year during the period shown, after payment of debt service on the existing State loans and Capital Expenses.

BERTH RENTAL INCOME

Permanent berthing fees constitute the largest share (92 percent) of Marina operating income. Table Vl-4 illustrates income which could be generated by the current boat berth inventory based on existing berth rates. The information is presented by sub-basin within the Marina. This presentation method is used since the redevelopment program phasing will be by basin.

Table Vl-4 shows that if the Marina's berths attained 100 percent occupancy, they would produce approximately $1.4 million annually. The table also shows the difference between each basin's berth inventory and income shares. If the table was evaluated further it would show that berths in each sub-basin vary in length with average berth lengths of 40.2, 28.6 and 28.2 feet in the West Basin, Outer West and East Basin respectively. The average slip length for the entire Marina is approximately 33 feet. This variation in berth lengths causes the West Basin to produce 51 percent of berth income with 39 percent of the berth inventory.

TABLE VI-4
BERTH INCOME BASED UPON CURRENT
SIZE DISTRIBUTION AND CURRENT RATES

		Potential Annual Income Per Sub-Basin (In Thousands)							
		West Basin		Outer West		East Basin		Total Marina	
Berth Length in Feet	Rate Per Foot Per Month	Berths	Income	Berths	Income	Berths	Income	Berths	Income
20	$4.81	21	$24.3	1	$1.2	19	$21.9	41	$47.4
25	4.81	36	52.0	35	50.5	153	220.8	224	323.3
30	4.88	41	72.0	32	56.2	103	181.0	176	309.2
35	4.88	23	47.1	0	0.0	68	139.4	91	186.5
40	5.92	72	204.6	1	2.8	0	0.0	73	207.4
45	5.92	20	63.9	5	16.0	0	0.0	25	79.9
50	6.05	17	61.7	0	0.0	0	0.0	17	61.7
60	6.05	25	108.9	0	0.0	0	0.0	25	108.9
90	6.18	10	66.8	0	0.0	0	0.0	10	66.8
110	6.18	4	32.6	0	0.0	0	0.0	4	32.6
		269	$733.9	74	$126.7	343	$563.1	686	$1,423.7
Percentage Per Basin		39%	51%	11%	9%	50%	40%	100%	100%

Source: City and County of San Francisco, Williams-Kuebelbeck & Associates, Inc.

Future changes in the Marina's berth income production due to the proposed redevelopment program can be caused by modifying the berth inventory or changing berth rates. Since berth income is so important to the Marina this is a key consideration of this financial feasibility analysis.

Table Vl-5 shows the effect of the proposed redevelopment program on the Marina •without assuming any berth rate increase. It can be noted, by comparing Table Vl-4 with Vl-5, that only 8 new berths are proposed in the Marina. Also, the berth size distribution remains essentially the same. The concept used here is to continue to serve existing Marina berth renters with new facilities.

TABLE VI-5
BERTH INCOME BASED UPON PROPOSED IMPROVEMENT PROGRAM
SIZE DISTRIBUTION AND CURRENT RATES

		Potential Annual Income Per Sub-Basin (In Thousands)							
		West Basin		Outer West		East Basin		Total Marina	
Berth Length in Feet	Rate Per Foot Per Month	Berths	Income	Berths	Income	Berths	Income	Berths	Income
20	$4.81	28	$32.3	1	$1.2	25	$28.9	54	$62.4
25	4.81	36	51.9	35	50.5	154	222.2	225	324.6
30	4.88	32	56.2	32	56.2	101	177.4	165	289.8
35	4.88	24	49.2	0	0.0	61	125.0	85	174.2
40	5.92	78	221.6	1	2.8	0	0.0	79	224.4
45	5.92	33	105.5	5	16.0	0	0.0	38	121.5
50	6.05	15	54.5	0	0.0	0	0.0	15	54.5
60	6.05	20	87.1	0	0.0	0	0.0	20	87.1
80	6.18	9	53.4	0	0.0	0	0.0	9	53.4
110	6.18	4	32.6	0	0.0	0	0.0	4	32.6
		279	$744.3	74	$126.7	341	$553.5	694	$1,424.5
Percentage Per Basin		40%	52%	11%	9%	49%	39%	100%	100%

Source: Moffatt & Nichol Engineers, Williams-Kuebelbeck & Associates, Inc.

RECOMMENDED REDEVELOPMENT FINANCING PLAN

Table Vl-3 projected an annual surplus of $333,000 for FY 1997-98. If this is added to the. estimated $1,957,000 Marina reserve fund balance total funding available for the redevelopment program at the start of FY 1998-99 would be about $2.3 million.

As noted. Table Vl-2, if the City and County (CCSF) was to borrow $14.5 million over the period shown, a new annual debt service requirement would amount to $890,000 annually by FY 2003-04. It is clear that in order for CCSF to afford the proposed redevelopment program it must increase revenues and reduce expenses significantly. As noted previously, the redevelopment program adds only 8 boat berths to the existing inventory at the Marina. Once the redevelopment program is completed the new boat slips will be the highest quality facilities at the finest location in San Francisco. In addition, significant savings in operating and capital expenses, can be enacted as a result of the redevelopment program.

WK.&A conducted a financial sensitivity analysis in order to develop the optimal financing plan.

Table Vl-6 presents a six-year projection of annual cash flows under the proposed financing program.

TABLE VI-6
SAN FRANCISCO MARINA
RENOVATION PROGRAM CASH FLOW PROJECTIONS
FY 1998-99 THRU FY 2003-04

	Fiscal Years - Figures in Thousands					
	98-99	99-00	00-01	01-02	02-03	03-04
OPERATING INCOME						
Berthing Fees						
Permanent Berths						
West Basin	$690	$613 [6]	$350 [6]	$919 [7]	$919	$919
Outer West	122	122	122	122	122	122
East Basin	541	541	541	270 [8]	684 [9]	684
Sub-total	1,353 [1]	1,276	1,013	1,311	1,725	1,725
Other Berth Related [2]	72	72	72	72	72	72
Sub-total Berthing Fees	1,425	1,348	1,085	1,383	1,797	1,797
Land Rents, Concessions & Miscellaneous [3]	137	141	145	149	153	158
Sub-total Operating Income	1,562	1,489	1,230	1,532	1,950	1,955
OPERATING EXPENSES						
Payroll [4]	627	646	665	616 [4]	600 [9]	618
Contractual & Other Services [5]	200	200	200	200	200	200
Materials, Supplies & Equipment [5]	37	37	37	37	37	37
Overhead [5]	56	58	60	62	64	66
Sub-total Operating Expenses	920	941	962	915	901	921
NET OPERATING INCOME	642	548	268	617	1,049	1,034
Less:						
CAPITAL EXPENSES	400	200 [10]	200	50 [11]	50	50
Plus:						
INTEREST INCOME [12]	114	131	152	157	74	93
NET INCOME	356	479	220	724	1,073	1,077
Less:						
DEBT SERVICE						
Existing	23	23	23	23	23	23
New [13]	0	43	86	362	672	890
Sub-total Debt Service	23	66	109	385	695	913
ANNUAL SURPLUS	333	413	111	339	378	164
Plus:						
PREVIOUS SURPLUS	2,290	2,623	3,036	1,147 [14]	1,486	1,864
CUMULATIVE SURPLUS	$2,623	$3,036	$3,147	$1,486	$1,864	$2,028
DEBT COVERAGE RATIO [15]	115.0	47.0	29.9	4.9	3.7	3.2

Source: City and County of San Francisco, Moffatt & Nichol Engineers, Williams-Kuebelbeck & Associates, Inc.

TABLE Vl-6
FOOTNOTES

1) Based upon95 percent of $1,423,700 capacity under 100 percent occupancy and current berth rental rates.

2) Average of FY 1993-94 thru FY 1996-97 used since annual totals vary.

3) Escalated at 3 percent per year.

4) Estimate for year reduced by 10 percent due to reduced maintenance personnel resulting from West Basin redevelopment.

5) Estimate for year and thereafter reduced by additional 5 percent due to reduced maintenance personnel resulting from East Basin redevelopment.

6) West Basin redevelopment from April 1,2000 to June 30,2001 (15 months). During this period berth fees assumed to be reduced by one-half.

7) Reflects a 95 percent occupancy based upon a 30 percent increase in current FY 1996-97 berth rates and new post-redevelopment slip configuration.

8) East Basin redevelopment from July 1,2001 to June 30,2002 (12 months). During this period berth fees assumed to be reduced by one-half.

9) Reflects a 95 percent occupancy based upon a 30 percent increase in current FY 1996-97 berth rates and new post-redevelopment slip configuration.

10) Capital expenses maintenance dredging costs reduced by 50 percent during and following West Basin redevelopment.

11) Capital expenses maintenance dredging costs reduced to $50,000 per annum for entire Marina when East Basin redevelopment program is undertaken.

12) Calculated at 5 percent of previous year's cumulative surplus.

13) See debt repayment schedules - Table Vl-2.

14) Surplus reduced by a $2 million capital contribution to the East Basin redevelopment program

15) Calculated as the ratio of net income plus prior year's cumulative surplus to total debt service.

The table is self-explanatory based upon its results and explanatory footnotes. The bottom line conclusion of the analysis is reflected in the debt-coverage ratios at the bottom of the

table. As noted, when the renovation program is completed, starting in FY 2002-03, the debt coverage ratio on the State loans is over 3. This ratio is about twice as strong as the 1.5 ratio usually considered very conservative for municipal revenue bond issues.

In addition to the strong debt coverage ratio, the CCSF will contribute $2 million to the Phase Ill-East Basin renovation program.

The most significant aspects of the recommended financing plan are highlighted below.

Increase Berth Rates For New Berths

An important element of the financing plan is to increase the berth rates for new slips in the West Basin and the East Basin when the renovation of each basin is completed. The last berth rate increase at the Marina occurred in FY 1993-94. That increase was 30 percent. We are suggesting another 30 percent increase as part of this financing plan. Such an increase would essentially amount to a 3 percent cost of living increase annually over the period since 1994.

To illustrate the impact of the rate increases. Table Vl-7 shows comparable current rental rates at the Marina and in the other two marinas in San Francisco.

It can be noted that the 30 percent increases proposed for the post renovation situation from $5.65 to $7.35 for the West Basin and from $4.85 to $6.30 for the East Basin still keeps these rates under existing average rates for the Pier 39 current 1997 rates. In fact, when the post renovation average rate ($6.36) is compared to the current averages for Pier 39 and South Beach Marina, the latter are higher than the Marina's projected post-renovation levels under the current situation. The point is that the proposed increases in berth rates, which will be required to make the project financially feasible, are not excessive.

The importance of the increases in berth rates is shown on Table Vl-6. It can be noted that the rate increases described above will increase Operating Income by $372,000 per year from the pre- to post- renovation condition $1,353,000 per year in FY 1998-99 to $1,725,000 per year in FY 2002-03. This Operating Income increase is important to program financial feasibility since debt service expenses over this same period will increase by $890,000 per year. In essence, new Operating Income from increased boat berth rates where new facilities are provided, could pay for about 42 percent of this increase in expenses.

TABLE Vl-7
SAN FRANCISCO MARINA
BERTH RATES PRE- AND POST—RENOVATION PROGRAM

	Rates Per Linear Foot Per Month		
	Pre-Redevelopment Current 1997	Post Redevelopment Projection	Pre to Post Redevelopment Rate Increases
West Basin Average	$5.65	$7.35	30%
East Basin Average	4.85	6.30	30%
Outer West Average	4.98	4.98	0%
Total Marina Average	5.24	6.36	21%
Pier 39 Average	7.63		
South Beach Marina Average	7.06		

Source: City and County of San Francisco, Williams-Kuebelleck & Associates, Inc.

Reduction in Capital Expenses

Another important element of the financing plan is the decrease in Capital Expenses which are expected to occur due to the renovation program. As previously noted, the Marina's expenditure on Capital Expenses has normally exceeded $400,000 per year. The major portion of Capital Expenses, according to Marina management, has been used for maintenance dredging. Based upon discussions with Marina management, it is projected that $350,000 per year will be a realistic reduction in Capital Expenses from a pre- to post- renovation program. This annual saving could assist in paying about 39 percent of the increase in annual debt service expenses.

VII. CONCLUSIONS AND RECOMMENDATIONS

A. Project Feasibility

1. Engineering

The proposed San Francisco Marina improvements are feasible from an engineering perspective. Construction of all improvements can be accomplished as proposed. The Project Elements are identified in Section III and further described in Section IV. Primary construction concerns relate to:

- Constrained site access along the San Francisco waterfront; and
- Need to minimize disruption of Marina operations during construction.

The total construction cost of the improvements is estimated to be $14.5 million in 1997 dollars, including engineering, administration, and contingencies. When allowance is made for escalation to the time of construction, the total project budget is estimated to be $16.5 million. The total number of berths in the Marina will be about the same (620 vs 612) as the existing number of berths, with a slight change to the distribution of boat sizes. The existing berths in the outer basin of West Harbor will not be replaced at this time. The existing and proposed berth size distribution are presented in Table VII- 1.

2. Financial

The proposed San Francisco Marina improvements are feasible from a financial perspective. The preferred source of funding for the Project is three low interest loans from the California Department of Boating and Waterways as indicated in Table Vl-2 (page 28). Additional funding is available from Marina reserves in the amount of $2 million. Future maintenance costs are expected to decrease with new construction and completion of dredging.

Total income is projected to be sufficient to cover operating expenses and debt service from the Project. Slip rental rate increase of 3 *0°/o* is required, but is considered reasonable given market rents for comparable marina facilities in San Francisco and the substantial benefits which will accrue to the Marina's tenants.

TABLE VII-1
BERTH LENGTH DISTRIBUTION

Berth Length	Inner Basin West Harbor Proposed	Inner Basin West Harbor Exist.	East Harbor Proposed	East Harbor Exist.	Project Total(l) Proposed	Project Total(l) Exist.	Total Outer Basin West Harbor(2)
20’	28	21	25	19	53	40	1
25’	36	36	154	153	190	189	35
30’	32	41	101	103	133	144	32
35’	24	23	61	68	85	91	---
40’	78	72	---	---	78	72	1
45’	33	20	---	---	33	20	5
50’	15	17	---	---	15	17	4
60’	20	25	---	---	20	25	---
80’	9	---	---	---	9	---	---
90’	---	10	---	---	---	10	---
110’	4	4	---	---	4	4	---
Totals	270	269	341	343	620	612	74

1. Project totals do not include the Outer Basin of West Harbor.
2. The proposed project does not include renovation in the Outer Basin of West Harbor.

B. Construction Phasing

The construction of the Project will be accomplished in a three - phase program. The Project elements in each phase are described below.

Phase I (1998/99)

- Engineering design of both the West Harbor and East Harbor project elements
- Completion of project review according to California Environmental Quality Act (CEQA) guidelines, for the East Basin
- Phase I Budget $1.4 million escalated

Phase II (1999/2001 Fiscal Years)

- Inner Basin West Harbor Floating Dock Replacements
- Inner Basin West Harbor Utility Upgrades
- Inner Basin West Harbor Gangways and Security Gates
- West Harbor Parking Access Control Gates
- West Harbor Dredging
- West Harbor Revetment Renovation
- West Harbor Landscaping
- Phase H Budget = $6.0 million escalated

Phase III (2001/02 Fiscal Years)

- East Harbor Breakwater
- East Harbor Floating Dock Replacements
- East Harbor Utility Upgrades
- East Harbor Gangways and Security Gates
- East Harbor Parkway Access Control Gates
- East Harbor Dredging
- East Harbor Revetment Renovation
- East Harbor Landscaping
- Phase m Budget = $9.1 Million escalated

C. Implementation Program

The implementation plan for the San Francisco Marina improvement project is based on the three - phase program. The various tasks are described below.

- Loan Application: The application for DBAW funds is due in June 1997. The funding process takes about I year to complete. Funding for each phase of the project will be released in the fiscal year that work is to be performed.

- Environmental Certification: Environmental certification for the West Harbor improvements was completed in May 1997. Environmental certification for the East Harbor improvements is to be completed by November 2000.

- Final Design: The final design and preparation of contract documents is estimated to take 8-10 months. The documents will be prepared to allow for the award of construction work in two phases. Design of the West Harbor Improvements must be completed in time to allow advertising and award prior to the scheduled start of Phase II construction.

- Contract Award: The advertisement and award of a construction contract is estimated to take 3 months.

- Construction: West Harbor construction is expected to take about 15 months, and East Harbor construction is expected to take about 12 months.

D. Permit Application

- The application for project permits should begin once the environmental certification is complete. Permit work must be coordinated with the design process to be certain that final design conforms to the conditions of the permits. The permit process for each phase of construction is estimated to take 9 months. Permits for the project will be required from the following agencies:

    - U.S. Army Corps of Engineers
    - Bay Conservation and Development Commission (BCDC)
    - San Francisco Bay Regional Water Quality Control Board
    - California State Lands Commission
    - City and County of San Francisco

- Prior to the submittal of the permit application to these agencies for the East Harbor, an environmental certification is required. The project also needs a Master Plan Referral for consistency with the City's Master Plan.

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